

ational Forest contains 2
eas and 10 additional RARE II
a total of about 330 mi² (see
treat all the separate areas
ty, they were combined into
300 mi², which includes
reas.

Clough, at the west edge of the study area, trests unconformably on the Ammonosuc (cs. The Littleton Formation, mainly phosed equivalents of gray marine shale, one, and sandstone is probably a few thousand ick in the study area, the most aluminous rocks of the Rangeley, Perry in, and Littleton Formations have abundant cory minerals would require extensive siltion.

The inferred sedimentary setting of the smaller anomaly approximately coincides with ywacke of the Littleton Formation near the side of the area (Canney and others, in The inferred sedimentary setting of the mand Devonian formations, in a marine basin to units of metamorphosed volcanic rocks exposed he western side of the study area are puished on the map because of their possibly it-hosted copper deposits.

To units of metamorphosed volcanic rocks exposed he western side of the Study area are puished on the map because of their possible resource importance. The small, probably it-copper deposit at the Coppermine Brook mine in a narrow belt of metavolcanic rocks it at the Coppermine Brook mine in the Mount Moosilauke septum. Minor cof copper deposit at the Coppermine Brook mine in an area, west of Mount Moosilauke septum. Minor cof copper mineralization was seen elsewhere volcanic, exposed only at the western edge study area, west of Mount Moosilauke and east conia, are part of a strike belt that contains (Annis, 1982). This belt is part of an etarcinc mine and the Franconia ne (Annis, 1982). This belt is part of an etarcinc pocks of the study area avarious granitic rocks of the study area and illowed a

Annis, M. P., 1982, Banded magnetite-quartz ironformation in the Ammonosuc volcanics, Sugar
Hill, New Hampshire: Geological Society of
America Abstracts with Programs, v. 14, nos. 1-2,
p. 2.
America Abstracts with Programs, v. 14, nos. 1-2,
p. 2.
Beport of Investigations: U.S. Bureau of Mines
Report of Investigations 7070, p. 51-122.
Ceological Society of America Bulletin, v. 48, p.
463-566.
Itilings, M. P., 1937, Regional metamorphism at the
Littleton-Moosilauke area, New Hampshire:
Geological Society of America Bulletin, v. 48, p.
463-566.
Itilings, M. P., 1956, Bedrock geology, Pt. 2 of The
geology of New Hampshire: Concord, New Hampshire
Planning and Development Commission, 203 p.
In press, Gravity and magnetic maps of the
wilderness and roadless areas of the White
Wilderness and roadless areas
Geological Survey Miscellaneous Field Studies Map
MF-1594-D, scale 1:125,000.
See Geological Survey Miscellaneous Field Studies Map
MF-1594-D, scale 1:125,000.
See Geological Survey Miscellaneous Field Studies Map
MF-1594-D, scale 1:125,000.
Geological Survey Miscellaneous Field Studies Map
MF-1594-D, scale 1:125,000.
See Geological Survey Open-File Report 75-59,
Geological Survey Miscellaneous Field Studies Map
MF-1594-D, scale 1:125,000.
See Geological Survey Open-File Report 75-59,
Jr., 1975, Uranium and thorium in
samples of rocks of the White Mountain plutonic
series, New Hampshire, and whole rock chemical
and spectrographic analyses of selected samples:
U.S. Geological Survey Open-File Report 75-59,
Jr., Stewart, G. W., and Shainin, V. E., 1954,
Pegmatite investigations, 1942-45, New England:
U.S. Geological Survey Open-File Report 75-59,
Jr., Stewart, G. W., and Shainin, V. E., 1954,
Pegmatite investigations, 1942-45, New England:
U.S. Geological Survey Open-File Report 75-59,
Jr., Stewart, G. W., and Shainin, V. E., 1954,
Pegmatite investigations, 1942-45, New England:
U.S. Geolog

wo-mica granite, recognized worldwide for its metallogenic specialization for tin, tungsten, um, lithium, and uranium (Boudette, 1977, p.) rms discrete plutons and innumerable small in the study area. It constitutes about 20 of the Paleozoic plutonic rocks of the area. On its south of the study area, two-mica granite to the occurrence of secondary uranium and in the secondary deposits. The two-mica of the study area is, however, a less of the study area in comparison to comway and Mount Osceola Granites of the ountain Suite. The two-mica granite from the study area in comparison to Comway and Mount Osceola Granites of the ountain Suite. The two-mica granites of the ountain suggest that the two-mica granites of dy area are less favorable hosts for secondary deposits than the Comway Granite. Mhereas so fathadard stream-sediment samples delineate uranium anomaly within the Mnite Mountain th, only small uranium anomalies occur outside than the commay Granite of the hange Roadless Area, overlaps a body of two-mica granite side of the hange Roadless Area, overlaps a body of two-mica granite side of the hange Roadless Area, overlaps a body of two-mica granite side of the south and one to the northeast than the southast side of the southast side

MOUNTAIN NATIONAL FOREST,

COUNTIES,

				osed in the frame the intain	rite-, Mount Mount the the land tth and by and hite hite ntruded own	Mesozoic uped on ages: ali	13; mica) at mica) at bstantial o Gazdik rea have in ryl.	gmatite t mica and um, and ude f the ica	o locally e served atially order for ial in e closely	econdary ereas delineate tain outside the y of two-	the are in coording less	source of wo-mica s only the by of two- osition	tror its trungsten, 977, p. 987, p. 987, p. 100 11 20 11 20 11 20 11 area. 12 area.	cks that (Gair and ea egmatite age (see	stern edge and east contains ranconia	ssible bably Brook mine s inor	the basin le for the ssibly ks exposed	ercent of ary rocks olith, and es with	housand housand y, Perry dant ese	area,
Major oxides are arithmetic mean of 2 minor elements from Tischendorf (2 Major oxides are arithmetic mean of 2 elements from Tischendrof (1977, 3 Average composition of Maine younger (1980, table 1). 4 Arithmetic mean of six samples of Con Wild River stock; range from tin 5 Arithmetic mean of five samples of Con (Butler, 1975, table 3). 6 One sample of Mount Osceola Granite for the samples of Samples	L† Rb Sn	Si02 A1203 9Fe0 Mg0 Ca0 Na20 K20 Ti02 P205 Mn0	[Leaders shown in Denver, Carrontium Sample ty Oxide/Ele	Table 1	outside the area of the pribell of deposits, however, belt of plutons and igneous Mountain Suite. Cox (1970) relationship. The magnetit Mountain (no. 5) is interprin Conway Granite, crossed quartz, fluorite, phenacite drusy quartz and small vein and pyrite are common. The content, but contains highberyllium, zinc, lead, and Goldsmith (1968), who descr suggested that the Conway G should be explored for othe	amounts of arsenopyrite, che molybdenite, and fluorite. disseminations at the Masco Shelburne (no. 3), Brook Co Woodstock (no. 9) mines or belt of 11 known similar frommonly argentiferous lead Hampshire. The known depos	minerals, and wolframite. minerals, and wolframite. placer mineral deposits may area. In Nigeria, fracture found mainly in the greisen massive and vuggy quartz (0 Hampshire, vein-type tin mi at the long-abandoned Jacks where Jackson (1844) descriin schist containing massive	By analogy with the Ni 1980), bedrock tin deposits occur (1) as low-grade dissin the margins and roof zor (Conway Granite) formed at shortly after solidificatic (2) as younger fracture-core	more tin were obtained from some at high altitudes, whe concentrates from eroded de carried away long ago. This strengthened by the fact the defined by abundant tin det samples of stream sediments mineral concentrates.	extends far outside areas undertends far outside far	uranium, zinc, lead, niobiu sediment samples, and thorimineral concentrates of strangular grains of cassiteri across were identified in sacross were identified in some all of the tin, however form of cassiterite. Topaz greisens also was identified	The geochemical data a geochemical survey (Canney the investigation in the Per (Sabin and others, 1982) has anomaly, covering about 300 White Mountain batholith. Indefined on the basis of exception of the expy-mineral concentrates, smaller but well-defined and state of the expy-mineral concentrates.	highest rubidium contents of about 40-60:1; Hoisington that this body has the high specialization. Although judge the potential of a present knowledge of petro. Hoisington's approach shou	Conway occur in two sample rubidium contents and low ppm Rb, K:Rb 96:1; 45 ppm 58:1). Both samples were lie just outside the area Hoisington (1977) observed the Conway have different characteristics.	specifically studied by 01 arithmetic averages of 22 ppm tin (stanniferous) and (mineralized). The averaging six samples (table 1) of the Conway; the six sample tin Interestingly the beautiful of the Conway; the six sample tin Interestingly the beautiful of the Conway; the six sample tin Interestingly the beautiful of the Conway; the six sample tin Interestingly the beautiful of the Conway; the six sample tingle of the Conway; the six sample tingle of the conway; the six sample tingle of the conway; the six sample of the conway;	specialized granites tend potassium contents, and the exceptionally low titanium calcium contents. Average granite contains about 50 table 1), in accord with t contents of the stannifero	Tischendorf (1977). Excepand slightly higher FeO an Conway, average Conway Grato average Jurassic biotit Nigeria in major-oxide and (table 1). As shown by Ti	Osberg and others, 1978). average contents of 11 ppm in the Conway Granite. Ac (1977), average uranium co ppm and average thorium co ppm from one pluton of the data listed in table 1 dem metal-specialized accordin	The Conway Granite is radioactivity and high ura It has been considered as of uranium and thorium, as might be found in secondar geothermal energy resource	also is present locally, s not strictly an ilmenite-s 1982) of the type characte
	40 400 80 200 580 405 <100 3 40 <30	70.84 73.38 75.49 14.33 13.97 12.62 2.49 1.92 1.58 .81 .47 .16 1.89 .75 .54 3.44 3.20 4.18 4.34 4.69 4.63 .34 1.6 .1203 .06 .05 .02 .09 .37 .43	() indicate no data; >, gre columns 4, 6, and 8 analyzed Colo:: major oxides analyzed Jr., and J. W. Baker; fluoring, and tin analyzed by Patty Bype Normal Special Nigeringle (1) (2) (3)	Chemistry of Conway and Mountite Mountain batholith and ne land specialized granites (Tinthern Nigeria (Dlade 1980)	ncipal tin anomaly. The broadly coincides with the complexes of the White inferred a genetic e-phenacite deposit at Iron eted as a replacement skarn by irregular veinlets of galena, sphalerite, and danalite-helvite; deposit has a low tin grade concentrations of silver. Barton and ibed the deposit in detail, iranite and its contacts of deposits of this type.	The lead-zinc veins or of the lead-zinc veins of a prospects are part of a factured-controlled, l-zinc deposits in New of this type are	Other types of bedrock and Other types of bedrock and / also occur in the study / also occur in the study e-controlled cassiterite is in S, and sphalerite is in New ineralization is represented son tin mine (no. 4 on map) ibed intersecting thin veins to cassiterite and small en	igerian setting (Olade, in the study area could seminations of cassiterite nes of the biotite granites subsolidus temperatures on of the granite; and arrolled lodes and greisen	n rapid mountain streams, ere residual placer eposits would have been is interpretation is lat the anomaly is also tected in fine-grained bulk as well as in heavy-	n of the batholith and underlain by the Conway se of the tin, the anomaly result of residual cassiterite in the tin of the anomaly is present in bedrock, for entrates having 2,000 ppm or	um, and beryllium in stream- ium and niobium in heavy- ream sediments. Sharply ite as much as 0.1 in. some of the concentrates; r, is necessarily in the r, characteristic of tin	resulting from the regional and others, in press) and emigewassett Roadless Area ave delineated a major tin 0 mi ² and centering on the The principal anomaly is ceptionally abundant tin in and it incorporates reas of anomalous tin.	and the lowest K:Rb ratios, 1977, fig. 8), suggesting hest degree of it would be premature to luton on the basis of the chemical details, ld be investigated.	rynes, the highest in the kish aving the highest K:Rb ratios (17 ppm Sn, 478 Sn, 636 ppm Rb, K:Rb collected from outcrops that cof the principal anomaly. that different bodies of petrographic and chemical the Baldface stock have the	ppm tin, and ranges of 2-114 2-117 ppm tin content of 13 ppm tin f Conway Granite is low, but for convert of 10 ppm s range from 0 to 45 ppm s range from 0 to 45 ppm	to have high silica and ley are characterized by iron, magnesium, and Jurassic Nigerian biotite ppm thorium (Olade, 1980, he Conway Granite. Tin las and mineralized granites	of for higher K ₂ U:Na ₂ U ratios of CaU contents in the nite is remarkably similar segranite of northern minor-element composition schendorf (1977),	Page (1980) cited estimated uranium and 53 ppm thorium cording to Hoisington ntents range from 10 to 13 ontents range from 45 to 80 conway to another. The nonstrate that the Conway is	s well known for its high anium and thorium contents. a possible low-grade source the source of uranium that y deposits, and as a (Bothner, 1978; Page, 1980;	suggesting that the Conway is series granite (Ishihara, eristic of Circum-Pacific tin
104 140 "327 samples (Tischendorf, 1977) 1977, p. 56-71, 87). 62 samples (Tischendorf, 1977, p. 56-71, 87). granite (Jurassic) biotite gran way Granite from White Mountain content is 0-45 ppm. nway Granite from White Mountain way Granite from White Mountain way Granite from White Mountain batholith. nt Osceola Granite from White Mountain batholith.	78 8 438 350 49 13	74.40 73.14 67.30 13.60 13.34 15.30 1.84 2.82 3.42 <.16 .15 <.10 .69 .74 .95 3.61 3.56 4.70 5.27 5.38 5.90 .16 .18 .27 <.06 .06 <.05 <.03 .05 .14 .2712	ater than; <, less than. So by laboratories of U.S. Geology J. S. Wahlberg, A. J. Bare e analyzed by D. B. Hatfield illings] an Conway Mount (4) (5) (6) (6)	t Osceola Granites (Triassicarby two-mica granite (Devoisechendorf, 1977) and Jurass:	the tin anomaly ad of Mount Moosilauk the basis of analy from stream sedime ppm tungsten, 500 (maximum obtained mine), and more the sulfide mineral de suggested occurren of recent interest speculative and ne England. Nonmetallic c dimension stone, regamatite minerals	rocks and metagray rocks and metagray in the Ammonosuc volcanogenic coppe the Littleton Form mine (no. 7); and massive-sulfide de as at the Ore Hill may occur in a nar	for postulated ura for postulated ura A low mineral several types cont and tin is assigne northeast-trending the Jobildunk and Pond and Kinsman M deposits are of th	amounts of thorium other metals that area A. Deposits formed at high tem emplacement of the temperatures possiprecipitation from	accumulations of uncommunitions of the Conway Granite; for veins, as at sever area A; and for reaction (BeSiO ₄) skarns, he grade concentration silver, as at the Deposits of unknown	zones (if they sting as higher grade from roof zones of the containing cassite wolframite, in Palackson tin mine (Large parts of the containing cassite the containing cassite wolframite, in Palackson tin mine (Large parts of the containing cassite the containing cassite cas	study area, howeve mineralization has The deposits accumulations of compajor drainages. (1) low-grade diss	A. The classifica geochemical anomal beryllium, niobium evidence that the This classificatic similarity of the Suite and the Jura Nigerian tin distr	Area. These tin depretated to the Color outside areas under classification is most heavy-mineral obtained from area percent of the st	to an area of about to an area of about of allowing areas of in New Hampshire: thirds of the Pem Sandwich Range Ropresidential Range southern parcel of	of the batholith uranium veins. ASSESSMENT A moderate read for associate	type uranium depo- convection long a uraniferous pluto a process might a coincides with th should be conside induced by radiou	long dimension of sediment samples. pattern around the Granite. Further investigations of	As in known mineralization may fracture systems preliminary linea and Donald Segal satellite photogris a belt of line	Granite. Because the margins of the margins of the beargued that the and the one local batholith are relaround plutons the erosion.	delineate some of if any have survi mineralized conta
table 2); ite from (batholith n batholith	92 256 191 <3	71.70 71.4 13.33 15.3 2.63 1.5 .15 .4 .99 1.1 4.07 3.4 5.17 4.5 .29 .2 .10 .1 .09 .0	urvey Two-	(Triassic to Cretaceous) of the (Devonian) compared with a Jurassic biotite granite	tin anomaly adjacent to area B abount Moosilauke. The classification of analyses of heavy-miner stream sediments that yielded a stungsten, 500 ppm molybdenum, 3, imum obtained downstream from Colimum obtained downstream from Colimum obtained downstream in and mear than 2,000 ppm tin, ide mineral deposits in and near sted occurrence of stratabound ested occurrence of stratabound ested occurrence of stratabound ested occurrence of stratabound ested occurrence of stratabound as the interest elsewhere in the ulative and needs further invest and. Nonmetallic commodities such as stone stone, refractory minerals and minerals commodities and	wacke of the Littly Volcanics; (2) str Volcanics; (2) str r deposits in metalation, as at the (3) volcanogenic oposits in the Ammomine (no. 11). Trow belt that external volcanogenic oposits in the control of the trow belt that external volcanogenic operations of the Ammomine (no. 11).	resource potential resource potential resource potential raining tungsten, reading to a much small parts of the lountain Roadless e following types of the control of the c	and niobium, in define the geocher of tin and other of tin and other peratures immediate Conway plutons, bly long after empradioactively her	ranium in fracturarianium in fracturar possibly argent in small abandones iplacement magnetic laving low contentins of beryllium, Iron Mountain minum type may also com	ill exist) of the acture-controlled conway plutons (agled); or (3) as hisrite, several sulfictions (actually actually ac	ew small mines and er, evidence for i s not yet been fou in area A possibl. assiterite in gra Bedrock tin depos eminations along	ation is supported ation is supported lies of uranium, I n, and thorium wit Conway Granite is on is further supp White Mountain Plassic igneous compiets. With the evicts.	posits, possibly onway Granite, occu erlain by the Conw based on 2,000 pp I concentrates of A, and 20 to 700 'eam-sediment samp	area of about 300 mi ² (area A area of about 300 mi ² (area A wing areas of the White Mounta w Hampshire: approximately the w Hampshire: approximately the s of the Pemigewasset Roadless ich Range Roadless Area, the s ich Range Roadless Area, the s ich Range Try River Wilderern parcel of the Dry River Ex	of MINERAL RESOUR esource potential d deposits contain	sits may form by a feer crystallizations, such as the Coccount for the uralled that hydrother end that hydrother end cheating long	the tin anomaly Also visible is e Baldface stock o studies should in fracture patterns ers (1978) have su	s in known tin districts, fra lization may be important. F re systems in the study area inary lineament map prepared nald Segal (written commun., ite photographs. The most co elt of lineaments about 6-8 m	e. Because the principal and rgins of the White Mountain bused that the scattered lead-ze one locality of tin veins fith are related to mineralizath plutons that have not yet be no.	these centers, pa ved erosion, and t ct zones of plutor

Anoderate resource potential for tin deposits and for associated deposits containing lead, zinc, uvanium, nibbium, beryllium, and thorium is assigned to an area of about 300 mit (area A) that overlaps the following areas of the Mnite Mountain National Forest in New Hampshire: approximately the eastern two-thirds of the Hampshire: approximately the eastern by-estimatic hange Roadless Area, the southern half of the Sandkich Range Roadless Area, the southern half of the Sandkich Range Roadless Area, the southern half of the Sandkich Range Roadless Area, the southern half of the Sandkich Range Roadless Area, the southern half of the Sandkich Range-Dry River Milderness Area, and the southern parcel of the Dry River Ethension Roadless Area.

These tin deposits, possibly of several types related to the Conway Grantite, occur both within and outside areas underlain by the Conway. The classification is supported by well-defined by the classification is forest that were collected from a slightly smaller area within area A, beryllium, niobium, and thorium within area A, and by evidence from a slightly smaller area within area a. The classification is further supported by the similarity of the Wnite Mountain Plutonic-Volcanic Site and the Jurassic ignous complexes of the Study area, however, evidence for important interest to the standard and the study area, however, evidence for important interest and proceed in the Amountain plutonic-Volcanic Site and the Jurassic ignous complexes of the study area, however, evidence for important and order area and another so classification is a supported by the collection of the Migratian from the Study area, however, evidence for important and order area and greisens in the Conway Distons (again, if the cuplot so the deposits of the Wnite Mountain metal of the Conway Distons (again, if the cuplot so the convertible of the study area and process and greisens in the Conway Distons (again, if the cuplotis of the convertible of the study and the study area and and grey and the convertible U.S., Geological Survey Professional Paper 293, Canney, F. C., Hoad, F. H., Domenico, J. A., and Makagawa, H. M., in press, Geochemical survey of the Michael Makagawa, H. M., in press, Geochemical survey of the Michael Makagawa, H. M., in press, Geochemical Survey of the Michael Makagawa, H. M., in press, Geochemical Survey of the Michael Makagawa, H. M., in press, Geochemical Survey of the Michael Makagawa, H. M., in press, Geochemical Survey of the Michael Makagawa, H. M., in press, Geological Survey of the Jurses in New Geological Survey of the Jurses in New House of the Michael Makagawa, H. M., and Holland, H. D., 1979, May Showing at those trait graphic and structural setting of the Jurses in New Hampshire and Survey of the Jurses in Michael Makagawa, H. M., and Holland, H. D., 1979, May Showing at those trait graphic and structural setting of the Jurses in Michael Makagawa, H. M., and Holland, H. D., 1979, May Showing at those trait graphic and structural setting of the Jurses in Michael Makagawa, J. M., and Holland, H. D., 1979, May Showing at those trait graphic and structural setting of the Michael Makagawa, J. M., and Holland, H. D., 1979, May Showing at those trait graphic and structural setting of the Michael Makagawa, J. M., and Holland, H. M., and Holl

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MISCELLANEOUS FIELD STUDIES MAP MF-1594-B PAMPHLET ACCOMPANIES MAP

occur in the study area, but much better and more accessible deposits occur elsewhere in the region. For discussion of these commodities, readers are referred to Gazdik and others (in press).